This listing of claims replaces all prior versions and listings of the claims in the application.

In the Claims

1. (currently amended) A separation by ion implanted oxide (SIMOX) method of forming a semiconductor-on-insulator ("SOI") substrate, comprising:

implanting a base dose including oxygen ions at a first energy level into a buried region disposed below a major surface of a semiconductor substrate to form an oxygen-implanted region;

implanting a second dose including at least one of oxygen ions or nitrogen ions into said oxygen-implanted region at a second energy level while maintaining said substrate at room temperature~~, said second energy level having a value ranging from 10% less than said first energy level to said first energy level~~; and

annealing said substrate to cause said ions implanted by said steps of implanting said base dose and said second dose to be redistributed in said substrate and to react with a material of said substrate to form a buried oxide ("BOX") layer in said oxygen-implanted region, said BOX layer having an upper major surface adjoining ~~electrically isolating~~ a single-crystal semiconductor layer of said substrate disposed above said BOX layer and said BOX layer having a lower major surface adjoining ~~from~~ a single-crystal semiconductor region of said substrate disposed below said BOX layer, said BOX layer having ~~superior~~ a greater first mini-~~dielectric~~ breakdown voltage ~~strength per unit thickness~~ for thicknesses of said BOX layer of between at least about 500 angstroms and about 1400 angstroms.

2. (previously presented) The method of Claim 1 wherein said semiconductor layer of said substrate disposed above said BOX layer consists essentially of single crystal silicon and said BOX layer includes silicon dioxide.

3-6. (cancelled)

7. (previously presented) The method of Claim 1, wherein said first energy level is about 180 keV and said second energy level is about 165 keV.

8. (previously presented) The method of Claim 1, wherein said first dose is less than or equal to $4x10^{17}cm^{-2}$.

9-26. (cancelled)

27. (currently amended) The method of claim 1, wherein said BOX layer has a thickness of ~~up to~~ at least 1350 angstroms and said BOX layer has a first mini-breakdown voltage greater than about~~of at least~~ 75 volts.

28. (currently amended) The method of claim 27, wherein said single-crystal semiconductor layer adjoining said upper major surface of said BOX layer has a thickness of up to a nominal thickness of 700 angstroms.

29. (previously presented) The method of claim 1, wherein said second energy level is equal to said first energy level.

30. (previously presented) The method of claim 1, wherein said base dose is about $2.5x10^{17}cm^{-2}$ and said second dose is about $2.0x10^{15}cm^{-2}$.

31. (new) The method of claim 1, wherein step of annealing includes using internal thermal oxidation (ITOX) to form said BOX layer.

32. (new) The method of claim 31, wherein said annealing is performed at a temperature of about 1320 °C.